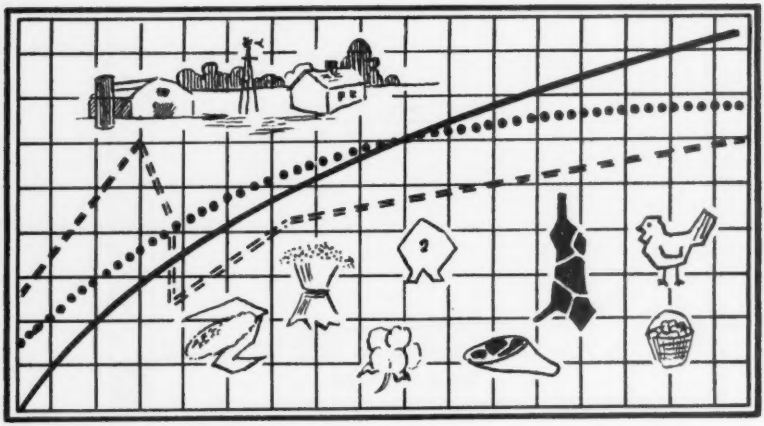
Oklahoma Current Farm Economics



SPECIAL REPORTS

Seasonal Price Patterns for Barley, Oats, and Alfalfa Hay

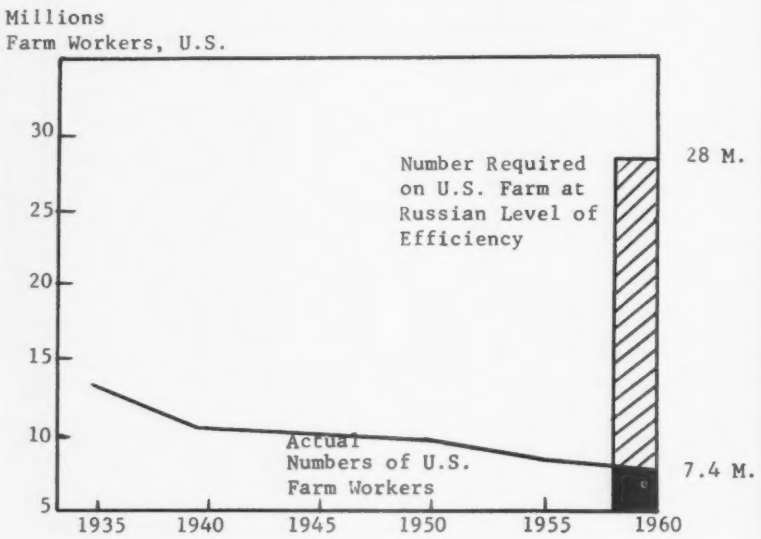
Estimates of Consumer Purchases of Selected Food Products in Oklahoma

Specialization on the Dairy Farm

June, 1961

Vol. 34, No. 2

"Catching Up" With Russia in Agriculture Would Mean
20 Million More Workers on our Farms



This would:

A. Raise our costs for food
B. Lower our standard of living
C. Decrease our ability to resist aggression

Oklahoma Current Farm Economics

Vol. 34 June, 1961 No. 2

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L. A. PARCHER, Editor L. F. MILLER, Dept. Head

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DIVISION OF AGRICULTURE

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Seasonal Price Patterns for Barley, Oats, and Alfalfa Hay

Odell L. Walker

Prices of oats, barley, and alfalfa hay, as well as most other agricultural products, fluxuate in a fairly regular month to month pattern within a crop year. Such price movements within a crop year or marketing season are called seasonal price variations. A knowledge and understanding of seasonal price patterns is important for planning livestock and poultry production and making crop and marketing decisions.

Data and Procedure

Seasonal price patterns for barley, oats, and alfalfa hay were estimated from average prices received by farmers in Oklahoma as reported by the Oklahoma Federal-State Crop and Livestock Reporting Service. Prices for the following years were used in the analysis: barley, 1946-47 through 1957-58; oats, 1949-50 through 1957-58; and, alfalfa hay, 1939-40 through 1957-58. These periods are generally representative of average market conditions. They include favorable and unfavorable crop years and a variety of livestock prices and crop and livestock production levels.

Monthly price indexes are the average of a ratio of the actual monthly price in each year to a centered, 12 month moving average for that month and year.[1] The index obtained for each month represents the relative standing of that month as compared with the average level for all months.

[1]Karl A. Fox and R. J. Foote, *Seasonal Variation: Methods of Measurement and Tests of Significance*, U. S. Department of Agriculture, Bureau of Agricultural Economics, Washington 25, D.C.

Variation in Seasonal Patterns

The average seasonal patterns may have considerable variation since conditions are seldom identical in two or more years. Therefore, the patterns are not perfect for prediction, but they do enable a producer or user of feed to improve his management decisions.

Two measures of variation are the standard deviation of individual years' monthly indexes, s, and the standard deviation of the average monthly index, s_x. These measures are commonly used to make generalizations concerning future seasonal patterns. For example, one might predict the range within which the average index would be expected to fall two-thirds of the time by adding s_x to the average seasonal index to obtain an estimate of the upper limit and subtracting s_x from the average seasonal index to obtain the lower limit. A similar procedure might be applied, using s, to obtain the 68 percent confidence range for individual years' monthly indexes. Usefulness of such generalizations depends on the adequacy of the sample period, the assumption that no major changes in marketing patterns will occur and the assumption that net seasonal prices changes are under consideration.

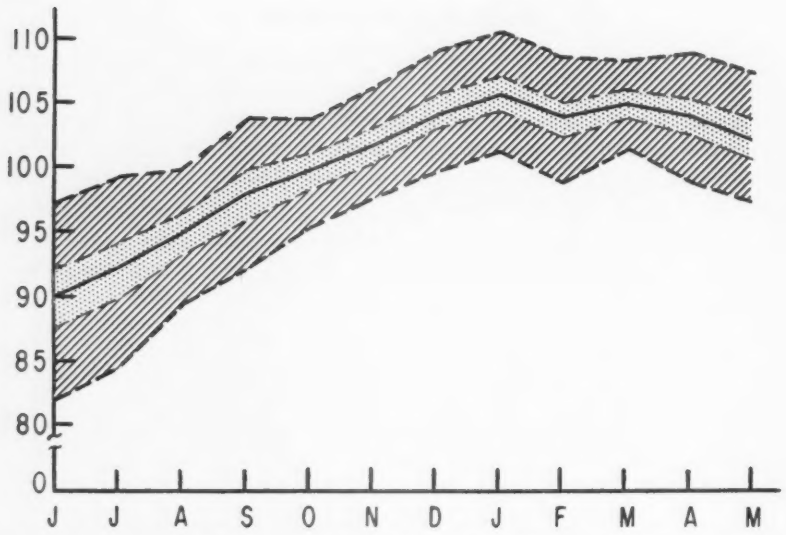

Figure 1. Seasonal Price Pattern and One Standard Deviation (s and s_x) Ranges of Variation for Oklahoma Barley Price.

Table 1. Seasonal Price Patterns for Oklahoma Barley, Oat, and Alfalfa Hay Prices, with Standard Deviations (s and s_x)

	Crop											
	Barley				Oats				Alfalfa Hay			
Month	Index	s	s_x	% of June Index	Index	s	s_x	% of June Index	Index	s	s_x	% of June Index
June	89.8	7.7	2.3	100.0	88.1	6.9	2.3	100.0	82.7	6.2	1.5	100.0
July	92.0	7.4	2.2	102.4	87.6	4.1	1.4	99.4	85.3	5.5	1.3	103.1
August	94.7	5.2	1.6	105.4	92.4	3.7	1.2	104.9	91.7	6.8	1.6	110.9
September	97.9	5.8	1.7	109.0	97.5	3.4	1.1	110.7	96.0	7.1	1.6	116.1
October	99.6	4.1	1.2	110.9	99.1	2.9	1.0	112.5	102.4	7.3	1.7	123.8
November	101.7	4.3	1.3	113.2	102.1	5.1	1.7	115.9	105.9	5.6	1.3	128.1
December	104.3	4.5	1.3	116.1	105.4	4.5	1.5	119.6	109.5	6.9	1.6	132.4
January	105.7	4.6	1.4	117.7	107.3	3.2	1.1	121.8	112.2	5.3	1.2	135.7
February	103.7	4.8	1.4	115.5	107.7	3.8	1.3	122.2	110.8	5.7	1.3	134.0
March	104.9	3.5	1.0	116.8	106.3	3.4	1.1	120.6	107.0	6.4	1.5	129.4
April	103.8	5.0	1.5	115.6	104.3	2.6	.9	118.4	104.5	7.5	1.7	126.4
May	102.1	4.9	1.5	113.7	102.2	3.3	1.1	116.0	92.0	6.7	1.5	111.2

Barley Seasonal Price Patterns

The average seasonal price pattern for Oklahoma barley prices is indicated by the solid line in Figure 1 and is given in Table 1. The prices of barley usually were lowest in June, increased to a seasonal high in January, and then decreased until harvest. Prices in June were 10 percent below the annual average price while in January they were about five percent above average. Using June as a base, prices were about 18 percent higher in January than at harvest time.

Variation in seasonal patterns is shown by the shaded areas in Figure 1. The dotted area defines the one standard deviation range of the average and the cross hatched area defines the one standard deviation range of individual year indexes. Based on this sample period and a confidence level of 68 percent (approximately two out of three years), the dotted area would include the average percentage and the cross hatched area would include percentages for individual years. For example, the one standard deviation range for the average June index over a period of years is 87 percent to 92 percent and one standard deviation range for June indexes in individual years is 82 percent to 97 percent.

Some managers are interested in magnitudes of possible gains or losses from storage as well as the average expectation. To provide these data, seasonal indexes were applied to three barley price levels. The storage period assumed was from harvest to the month having the highest price. Barley prices would increase $.14, $.17, and $.20 if barley prices average $.90, $1.10, and $1.30 per bushel, respectively, and the average pattern prevails (Table 2). Average increases are net of trend, cyclic or unusual price conditions.

Estimates of two-thirds confidence ranges for average and individual year seasonal price increases are given in Table 3. For example, the range for the average seasonal increase when barley is $1.10 is $.14 to $.20. The range for individual years is $.05 to $.32. The highest, $.39, and the lowest, $.04, price increase occurring during the period studied is also shown in Table 3. This range was computed from individual year indexes and actual prices for each year.

Oat Seasonal Price Patterns

Prices of oats in June were about 12 percent below the annual average while in February they were about seven percent above the average

Table 2. Estimated Average Seasonal Price Increases for Barley, Oats and Alfalfa Hay from Harvest to the High Price Month

	Barley			Oats			Alfalfa Hay		
	$/bu.			$/bu.			$/ton		
Annual average price level	.90	1.10	1.30	.60	.75	.90	20.00	25.00	30.00
Price received[1]	.95	1.16	1.37	.64	.81	.97	22.44	28.05	33.66
Harvest price[2]	.81	.99	1.17	.53	.66	.79	16.54	20.68	24.81
Seasonal increase	.14	.17	.20	.11	.15	.18	5.90	7.37	8.85

[1] Months having highest prices were: barley, January; oats, February; and alfalfa hay, January.
[2] Harvest month assumed was June for each crop.

Table 3. Variation of Estimated Seasonal Price Increases for Barley, Oats, and Alfalfa Hay

	Barley $/bu.	Oats $/bu.	Alfalfa Hay $/ton
One standard deviation range for average price increases	.14-.20	.13-.17	6.80-7.90
One standard deviation range for an annual price increase	.05-.32	.09-.21	5.00-9.70
Highest price increase	.39	.23	19.30
Lowest price increase	-.04	.07	1.90

price (Figure 2 and Table 1). Alternatively, February prices were about 22 percent above harvest prices (June). The average seasonal index for July was slightly lower than that for June. However, in recent years technological changes such as use of combines and new varieties has apparently caused a shift to lower June prices and relatively higher July prices.

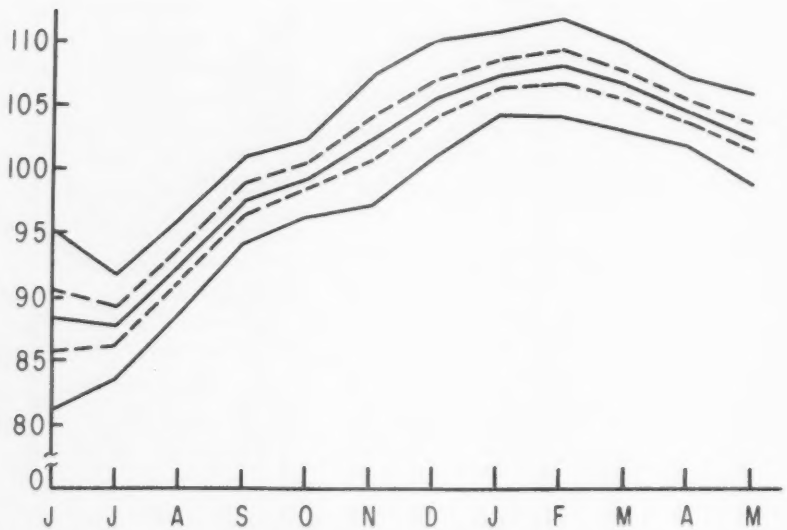

Figure 2. Seasonal Price Pattern and One Standard Deviation (s and $s_{\bar{x}}$) Ranges of Variation for Oklahoma Oat Prices.

Prices of oats at both harvest and early winter were more variable than in other months because of fluxuating feed requirements in the fall, shifts in harvest dates and varying harvest conditions. Ranges of variation in the seasonal pattern are shown in Figure 2 and may be interpreted as described for barley.

Table 2 contains seasonal price increases in dollars for three oat price levels. If the average seasonal pattern holds and oats prices are at the $.75 per bushel level, oat prices would increase $.15 per bushel from June to February. The one standard deviation range for seasonal price increases is $.13 to $.17 when oats are $.75. The one standard deviation range for price increases in any single year is $.09 to $.21. For the period studied, the seasonal increase for oats was never lower than $.07 per bushel and once reached a high of $.23 per bushel.

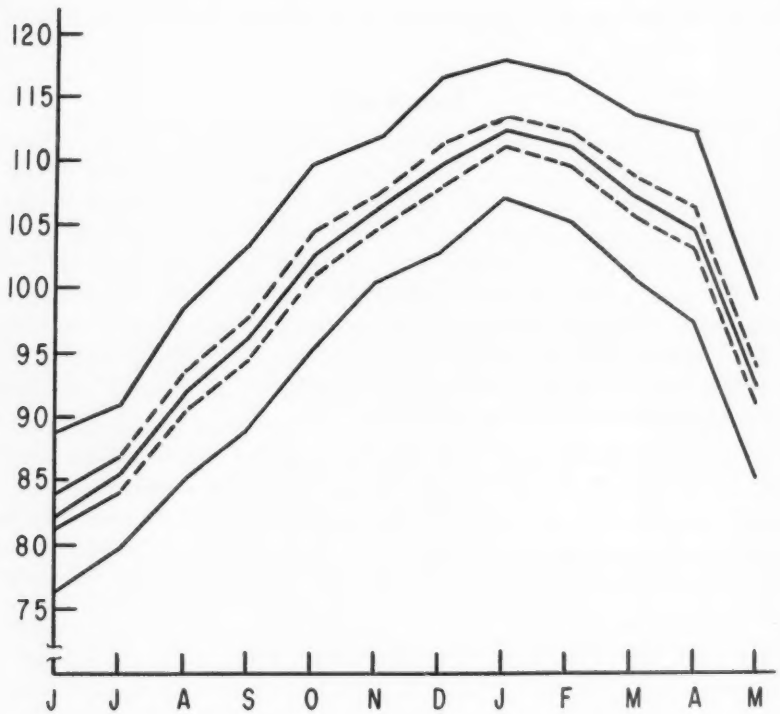

Figure 3. Seasonal Price Pattern and One Standard Deviation (s and s_x) Ranges of Variation for Oklahoma Alfalfa Hay Prices.

Alfalfa Hay Seasonal Price Patterns

Alfalfa hay prices had greater seasonal variation than other crops (Figure 3 and Table 1). State alfalfa prices were about 83 percent of average in June and 112 percent in January. Typically, January prices were 36 percent above June prices. Even though alfalfa harvest continues through early September, the September index is about 16 percent above the June index.

One standard deviation ranges for alfalfa hay price indexes are shown in Figure 3. Alfalfa hay prices are quite variable, particularly at late harvest, early fall and early spring. Production conditions and varying feed requirements are primarily responsible for this variation.

The seasonal pattern for alfalfa hay indicates a $7.37 price increase from June to January when average prices are at the $25.00 level (Table 2). The one standard deviation range for individual years' seasonal price increases during the 19 year period analyzed was $5.00 to $9.70. The minimum seasonal increase was $1.90 and the highest was $19.30.

Summary

Seasonal price patterns presented in this publication provide a basis for estimating total returns from storage. Such estimates may be obtained by applying the seasonal indexes for the month storing is to take place and the month sales are to be made to the expected average price level. For example, the average seasonal price index for alfalfa hay is 82.7 percent in June and 112.2 percent in January. With hay at $27.00 per ton, the expected *seasonal* price increase is 112.2 percent ($27.00) —82.7 percent ($27.00) = $7.86. Alternatively, the index of January as a percentage of the June index may be multiplied by the June price to give an estimate of the January price.

Some managers may want to consider ranges of possible returns from storage as well as average returns. Ranges of seasonal indexes and seasonal increases were provided for that purpose, along with standard deviations used in estimating ranges. The final decision to store depends on the relation of storage costs to expected returns or savings from storage.

Estimates of Consumer Purchases of Selected Food Products in Oklahoma

Preston E. LaFerney and Leo V. Blakley

Requests for information on the consumption of agricultural commodities in Oklahoma are frequent. Most available consumption data, however, are only for the United States, or in some cases for regions within the United States. This article reports the results from an attempt to estimate consumption of selected food commodities in Oklahoma from regional and national data.

The estimates are based on the comprehensive survey of food consumption made in 1955 by the U. S. Department of Agriculture for the United States and for regions including the South.[1] Generally, the data used in this study represent purchases for home consumption by households of two or more persons. All levels of urbanization are included. Home consumption of non-purchased food, either by urban families or by farm families is excluded.

Average family or per person purchases reported for the nation or for a major region cannot be used for an individual state. The level of food purchases is related to the amount of income available to the families and this income varies from one state to the next. Therefore, a relationship of income and food purchases for each food commodity

[1]U. S. Department of Agriculture, AMS and ARS, *Food Consumption of Households in the South*, Report No. 4 of Household Food Consumption Survey 1955, December, 1956.

was estimated for the South. Nine income groups were used. Consumption of each food by each income group was divided by the average number of persons in the family and multiplied by 52 weeks. This gave an estimate of annual per capita consumption based on weekly consumption. The income reported by each family group was also calculated on a per person basis.

Income Elasticity Estimates

The estimates of annual purchases of each food were plotted against the corresponding average per capita money income after taxes for each group, and curves with equations shown in Table I were fitted. From these equations, estimates of income elasticity were derived for the 1955 average per capita disposable income level for the South ($1,263). The income elasticity estimates are included in Table I. Income elasticity is a number which indicates the effect of a 1.0 percent change in income on the change in quantity purchased. For example, the income elasticity of beef and veal as reported in Table I is .36. This means that a 1.0 percent increase in income is associated with a 0.36 percent increase in the quantity of beef and veal purchased for consumption.

All income elasticity estimates were positive at the level of income used for the South. However, at higher levels of income some equations would indicate negative income elasticity estimates. Commodities with low income elasticity estimates (0.0 to 0.25) include fresh apples, lamb and mutton, oranges, potatoes, processed dairy products, fresh snap beans, processed snap beans, and processed sweet corn. Commodities with high income elasticity estimates (.60 and above) include processed apples, fresh milk and cream, grapefruit, peanuts, spinach (processed), and fresh strawberries. Commodities with intermediate estimates include meats (excluding lamb), lemons and limes, processed peaches, and many of the vegetables. The estimates were quite variable among the fruits and vegetables. For the latter group, five were below 0.30, eight were between 0.30 and 0.50, and two were above 0.50.

Estimated Consumption in Oklahoma

The equations in Table I were used to estimate Oklahoma purchases of each food at the 1955 per capita disposable income level ($1,385) and at the 1959 level ($1,481). For 1959, this was the current income deflated to a 1955 base by the consumer price index.

The estimates obtained from this procedure were subject to seasonal variation since they were based on estimated purchases during the spring

Table 1.—Equations for Food Consumption and Income Elasticity Estimates, South, 1955

Commodity	Estimating Equation[a]	R^2	Income Elasticity Estimate
Meats			
Beef and Veal	$Y = -89.01 + 46.66 \log X$	.89	.36
Broilers	$Y = -19.87 + 15.63 \log X$	.86	.24
Lamb and Mutton	[b]	--	--
Pork	$Y = 43.47 + .13(10^{-1})X - .26(10^{-5})X^2$	.43	.15
Turkey	[b]	--	--
Dairy & Poultry Products			
Butter (creamery)	$Y = 2.14 + .12(10^{-2})X$	.92	.41
Eggs	$Y = -30.05 + 18.16 \log X$	.96	.30
Fresh Milk & Cream	$Y = 23.87 + .24X + .40(10^{-4})X^2$	.97	.67
Processed Dairy Products (excluding butter)	$Y = -38.93 + 36.00 \log X$	.94	.22
Fruits			
Apples (fresh)	$Y = 10.53 + .51(10^{-2})X - .13(10^{-5})X^2$	.35	.16
Apples (processed)	$Y = -.23 + .30(10^{-2})X$	.67	1.07
Grapefruit	$Y = 5.38 + .75(10^{-2})X$	.88	.64
Lemons and Limes	$Y = 5.04 + .33(10^{-2})X$	.86	.45
Oranges	$Y = 5.40 + .54(10^{-1})X - .31(10^{-4})X^2 + .53(10^{-8})X^3$	.99	.04
Peaches (fresh)	[b]	--	--
Peaches (processed)	$Y = -9.88 + 5.52 \log X$	.85	.33
Strawberries (fresh)	$Y = .27 + .22(10^{-2})X$	.60	.91
Melons[b]	[b]	--	--
Vegetables			
Cabbage (fresh)	[b]	--	--
Carrots (fresh)	$Y = -9.53 + 5.16 \log X$	.87	.35
Celery	$Y = -11.10 + 5.26 \log X$	.84	.44
Cucumbers (fresh)	$Y = -7.32 + 3.82 \log X$	.58	.37
Lettuce and Escarole	$Y = -30.54 + 14.70 \log X$	.88	.42
Lima Beans (processed)	$Y = 1.44 + .24(10^{-2})X - .56(10^{-6})X^2$	.81	.35
Peppers	$Y = -2.10 + 1.10 \log X$	.87	.36
Potatoes	$Y = 44.01 + .37(10^{-1})X + .15(10^{-4})X^2$	.89	.03
Snap Beans (fresh)	$Y = -3.17 + 3.83 \log X$	.68	.19
Snap Beans (processed)	$Y = -1.18 + 1.90 \log X$	.70	.18
Spinach (fresh)	$Y = -2.13 + .99 \log X$	.35	.46
Spinach (processed)	$Y = .85(10^{-1}) + .30(10^{-3})X$	.88	.82
Sweet Corn (fresh)	$Y = 4.74 + .38(10^{-2})X$	.79	.50
Sweet Corn (processed)	$Y = 5.65 + .78(10^{-3})X$	.52	.15
Sweet Potatoes	[b]	--	--
Tomatoes (fresh)	$Y = -19.43 + 12.78 \log X$	.76	.28
Tomatoes (processed)	$Y = 4.95 + .54(10^{-2})X$	.97	.58
Nuts			
Peanuts	$Y = .61(10^{-1}) + .31(10^{-3})X$	.95	.86

[a] Y = annual per capita consumption in pounds. X = annual per capita money income after taxes.
[b] No equation fitted; average per capita consumption for the South was used.

Source: Estimated from data included in U. S. Department of Agriculture, AMS and ARS, *Food Consumption of Households in the South*, Report No. 4 of Household Food Consumption Survey 1955, December, 1956.

months. Therefore, the estimates were adjusted for seasonality of consumption. A conversion factor was obtained by comparing, commodity by commodity, estimated United States annual consumption based on weekly data with actual United States annual consumption.[2]

Per capita estimates of annual consumption, adjusted for seasonality, were multiplied by Oklahoma population for the two years to obtain the estimated total annual purchased consumption of each food in pounds. Since estimates of consumption were in terms of retail weight, they were converted to a farm-weight basis by use of standard conversion factors.[3] Estimated consumer purchases of each commodity for consumption are included in Table 2.

Comparison of Production and Purchased Consumption

For comparison purposes, Oklahoma production is also included in Table 2. Production data for meats and dairy and dairy products (other than fresh milk and cream) represent total annual production. Only commercial production of fruits, vegetables, nuts, and fresh milk and cream is represented, which excludes production consumed on farms where produced.

Oklahoma was a surplus producer of beef and veal, lamb and mutton, and turkey during both time periods. Surplus production of turkey increased considerably between 1955 and 1959. Both pork production and broiler production were below purchased consumption estimates during these years.

Production of eggs consistently exceeded purchased consumption. There was a slight surplus of fresh milk and cream, but a deficit existed for processed dairy products other than butter.

Oklahoma was a deficit producer of fruits, since only small quantities of most fruits were produced. Only strawberries were produced in surplus quantities in 1959; the strawberry crop of 1955 fell short of purchased consumption.

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[2]Annual consumption was obtained from U. S. Department of Agriculture, AMS, *Consumption of Food in the United States, 1909-52*, Agricultural Handbook No. 62, September, 1957 and *Supplement* for 1956.

[3]U. S. Department of Agriculture, ARS, *Food Yields Summarized by Different Stages of Preparation*, Agricultural Handbook No. 102, June, 1956.

U. S. Department of Agriculture, "Consumption and Utilization of Agricultural Products," *Major Statistical Series of the U. S. Department of Agriculture*, Vol. 5, Agricultural Handbook No. 118, December, 1957.

Table 2.—Production—Purchased Consumption Balance of Selected Food Commodities, Annual, 1955 and 1959 Oklahoma

Commodity	Units	1955 Production	1955 Purchased Consumption	1955 Surplus	1959 Production	1959 Purchased Consumption	1959 Surplus
Meats (live weight equivalent)							
Beef and Veal	1000 lbs.	1,091,010	289,689	801,321	1,114,790	313,332	801,458
Broilers	1000 lbs.	18,664	60,561	—41,897	16,832	64,804	—47,972
Lamb and Mutton	1000 lbs.	12,140	5,232	6,908	13,330	5,484	7,846
Pork	1000 lbs.	168,317	198,045	—29,728	192,061	209,599	—17,538
Turkey	1000 lbs.	12,358	5,444	6,914	18,666	5,705	12,961
Dairy and Poultry Prod.							
Butter (creamery)	1000 lbs.	27,368	7,196	20,172	18,710	7,766	10,944
Eggs	Million eggs	829	532	297	787	572	215
Fresh Milk and Cream	Million lbs.	691	618	73	845	676	169
Processed Dairy Prod. (excluding butter)	Million lbs.	206[a]	610	—404	143[a]	651	—508
Fruits							
Apples (fresh)	Pounds	NA	43,977,000	-----	NA	46,518,000	-----
Apples (processed)	Pounds	NA	10,479,000	-----	NA	11,798,000	-----
Grapefruit	Pounds	None	21,598,000	-----	None	23,674,000	-----
Lemons and Limes	Pounds	None	15,334,000	-----	None	16,600,000	-----
Oranges	Pounds	None	52,296,000	-----	None	54,483,000	-----
Peaches (fresh)	1000 bu.	15[b]	217	—500	155[b]	228	—394
Peaches (processed)	1000 bu.	15[b]	298	—500	155[b]	321	—394
Strawberries (fresh)	1000 lbs.	630[b]	1,918	—1,288	3,800[b]	2,140	1,660
Melons	1000 cwt.	998[c]	971	27	851[c]	1,018	—167
Vegetables							
Cabbage (fresh)	Pounds	NA	26,442,000	-----	NA	27,831,000	-----
Carrots (fresh)	Pounds	NA	11,062,000	-----	NA	11,946,000	-----
Celery	Pounds	None	16,547,000	-----	None	18,009,000	-----
Cucumbers (fresh)	Pounds	NA	7,145,000	-----	NA	7,730,000	-----

Table 2.—(Continued)

Commodity	Units	1955 Production	1955 Purchased Consumption	1955 Surplus	1959 Production	1959 Purchased Consumption	1959 Surplus
Vegetables (cont.)							
Lettuce and Escarole	Pounds	NA	41,981,000	-----	NA	45,635,000	-----
Lima Beans (processed)	Pounds	NA	5,848,000	-----	NA	6,259,000	-----
Peppers	Pounds	NA	3,768,000	-----	NA	4,076,000	-----
Potatoes	1000 cwt.	298	1,787	—1,489	294	1,860	—1,566
Snap Beans (fresh)	Pounds	NA	16,112,000	-----	NA	17,170,000	-----
Snap Beans (processed)	Tons	2,700	4,421	—1,721	10,500	4,706	5,794
Spinach (fresh)	1000 cwt.	23	15	8	25	17	8
Spinach (processed)	Tons	10,500	1,850	8,650	14,300	2,050	12,250
Sweet Corn (fresh)	Tons	14,300	10,990	3,310	NA	11,940	-----
Sweet Corn (processed)	Pounds	NA	22,530,000	-----	NA	23,880,000	-----
Sweet Potatoes	1000 cwt.	160	290	—130	98	304	—206
Tomatoes (fresh)	Pounds	NA	95,000,000	-----	NA	102,300,000	-----
Tomatoes (processed)	Pounds	NA	18,423,000	-----	NA	20,117,000	-----
Nuts							
Peanuts	1000 lbs.	128,640[b]	10,138	118,502	133,100[b]	11,290	121,810

a Estimated grade C milk production.
b Total commercial crop.
c Watermelons and cantaloupes.
NA Not available — only small quantities produced in most instances.
Sources: Production data are from U.S. Deparmtent of Agriculture, *Agricultural Statistics*, 1956 and 1960, and Oklahoma State Board of Agriculture and U.S. Department of Agriculture, AMS, *Oklahoma Agriculture*, Annual Report, 1956 and 1960.

Fresh and processed spinach were the only vegetable foods for which production consistently exceeded consumption.

The total commercial peanut crop exceeded purchased consumptions of peanuts for food by large margins in both years although a direct comparison is misleading. Consumption of peanuts in Oklahoma consists of many varieties and types not produced in large volumes in the state.

Specialization on the Dairy Farm

Clark Edwards

The trend in grade A milk production in Oklahoma is toward fewer, larger, more efficient dairy farms. In this changing environment each individual dairyman needs to find an efficient farm organization suited to his own locality, ability, and capital position.

Growth pattern studies on dairy farms in Central and Northeast Oklahoma indicate specialization rather than diversification on the larger, more profitable dairy farms of the future.[1] Dairymen can maximize profits over the years by concentrating their efforts on producing milk for sale. Most full-time grade A dairymen are already specializing in milk production in the sense that sales from beef and hogs, cotton and tobacco, and other farm products are treated as minor sources of income. To the extent that dairymen are producing feed grains, wheat, replacements, and forage, however, more specialization is possible. Let us examine these four enterprises one at a time.

Feed Grain Production

Feed grain production can profitably be included in a dairy farm organization when cropland is available at reasonable cost. As the size of the dairy herd increases, however, more forage is needed from the available land and feed grain production is the first victim of the process of specialization.

For example, some farmers in the study started with a herd of 60 cows on 320 acres of cropland with an additional 180 acres in native

[1]"Dairy Farm Organization in Central and Northeast Oklahoma," Clark Edwards and Herbert Grubb, Oklahoma Agricultural Experiment Station Bulletin No. B-573, February, 1961.

pasture. When the herd was expanded from 60 to 75 cows, the oats enterprise was reduced from 78 to 45 acres. The decrease of 33 acres in the oats enterprise freed that much land to produce forage for the added 15 cows. Oats are currently selling for about $37.50 per ton. The farmer in this example could pay more than $41 per ton to buy oats for feed grain rather than produce more oats at the expense of selling less milk.

Wheat Production

Wheat production is another target of the specialization process on dairy farms in Central and Northeast Oklahoma. Most of the farms studied had a wheat allotment from 20 to 40 acres in size.

At present price support levels for wheat, dairymen with large, efficient herds, limited land, and some readily available expansion capital can afford to give up the wheat allotment for the sake of a larger dairy herd. If the price of wheat were to fall to $1.00 per bushel, and other farm prices remained at present levels, all the dairymen represented by this study would stop growing wheat and specialize in more milk production.

Replacement Production

Most of the farmers interviewed said they pay about $220 per head for replacement heifers. Others paid about $200. At these prices, advantages through specialization by buying replacements rather than raising them can be realized on farms with low costs of milk production, limited acreage, and readily available expansion capital.

For example, a dairyman starting with an 84 cow herd on 440 acres of cropland with an additional 240 acres in native pasture would be willing to pay as much as $250 per replacement in order to transfer land, labor, and capital out of replacement production into a larger milking herd maintained by purchased replacements.

In other situations, it is cheaper to raise replacements than to buy them. Dairymen with 20 to 40 high producing cows are likely to have some land and labor to devote to replacement production. They can raise high quality replacements using resources that would not be employed in milk production anyway. In such cases, profit maximizing dairymen would rather raise replacements than buy them unless they have opportunities to buy high quality springer heifers for less than $200 head.

Hay Production

Fifteen percent of the dairymen interviewed were buying all their hay. Results of the cost and returns study indicate that those who have cropland capable of producing three tons of good quality alfalfa hay per acre will profit by raising, not buying, hay.

In no case studied were farmers able to pay as much as $25 per ton for alfalfa rather than produce all the hay needed on the farm. With the production efficiencies observed, few dairymen could afford to pay more than half the going price for a ton of good hay if they had the opportun ity to raise it themselves.

In cases where capital for herd expansion was available, and where land was limiting, the herd could profitably be expanded beyond the roughage base of the farm if a dependable source were available for obtaining good alfalfa hay for $18 to $20 per ton.

Conclusion

Dairymen in Central and Northeast Oklahoma who have herds of more than 20 cows but less than 120 should consider specialization of milk production as they plan for larger herds. Feed grain production is the first target of the specialization process. It is profitable to give up the wheat allotment and to buy replacements as a means of expanding the dairy herd when land is limiting and when investment capital is readily available. Ordinarily, it is not profitable to expand the herd beyond the forage base of the farm.

Table 1.—Monthly and Season Average[1] Prices Received by Farmers for Oklahoma Farm Products. (Dollars)

		Wheat	Corn	Oats	Barley	Rye	Grain Sorghum	All Hay	Alfalfa Hay	Wild Hay	Cotton Lint	Cotton Seed	Soy Beans	Pea-Nuts
1959		1.77*	1.09	.64*	.74*	.90	1.52*	18.30*	23.47	14.38*	.279*	37.60*	1.80*	.095*
1960**		1.74	1.08	.64	.73	.89	1.41	20.00	24.32	15.79	.283	40.80	1.86	.100
1960	May	1.81	1.16	.69	.78	.97	1.58	19.20	22.40	16.00	.277*	----	1.86	---
	June	1.68	1.18	.62	.72	.89	1.56	17.60	21.30	14.00	.290*	----	1.81	---
	July	1.69	1.18	.62	.69	.87	1.57	18.20	22.10	14.60	.295*	----	1.83	---
	Aug.	1.72	1.19	.65	.72	.88	1.49	18.60	23.00	14.60	----	----	1.82	---
	Sep.	1.78	1.05	.65	.73	.95	1.40	19.40	23.80	15.50	.311	40.00	1.80	.098
	Oct.	1.78	1.03	.65	.73	.95	1.38	19.90	24.00	16.30	.296	40.00	1.79	.100
	Nov.	1.79	1.04	.65	.74	.91	1.38	20.60	25.30	16.50	.279	41.00	1.82	.100
	Dec.	1.80	1.06	.66	.75	.89	1.40	21.10	26.00	16.50	.267	42.00	1.83	.095
1961	Jan.	1.83	1.10	.67	.77	.91	1.44	21.60	26.50	17.00	.261	43.00	1.95	.098
	Feb.	1.87	1.11	.66	.79	.90	1.51	21.70	27.00	17.00	.233	44.00	2.19	.096
	Mar.	1.85	1.12	.66	.79	.85	1.54	20.50	25.50	16.00	.260	----	2.26	.100
	Apr.	1.76	1.10	.62	.74	.84	1.53	20.00	25.00	15.50	.276	----	2.48	.102
	May	1.76	1.10	.61	.74	.81	1.57	18.40	21.50	15.00	.282	----	2.70	---

		Cattle	Calves	Sheep	Lambs	Hogs	Wholesale Milk	Butter-fat	All chickens	Commercial broilers	Eggs	Turkeys	Wool	Alfalfa Seed	Sweet Potatoes
1959		22.20	26.90	7.00	19.20	14.20	4.58	.53	.141*	.151	.272	.234	.34	19.80*	2.30
1960**		18.60	22.10	6.60	18.40	14.80	4.60	.53	.149	.149	.306	.241	.36	23.00	2.65
1960	May	20.00*	24.20*	7.00	20.00*	14.60	4.35*	.52*	.159*	.170*	.276	.24	.38	20.50	---
	June	19.30*	23.50*	6.00*	20.20*	15.10*	4.40*	.52*	.152*	.165*	.267	.22	.38	----	---
	July	18.60*	22.50	5.70*	18.50	15.80*	4.30	.52*	.156*	.170	.256	.22	.38	----	---
	Aug.	17.70	20.90	5.50*	17.20*	16.00*	4.35	.53	.150*	.160	.282	.22	.36	22.60	2.75
	Sep.	17.60*	20.50	5.50*	16.60*	15.40	4.60*	.54	.143*	.155*	.327	.23	.36	23.50	2.35
	Oct.	17.10*	20.50	5.40*	16.30	16.40	4.75	.55	.143*	.155*	.394	.24	.34	23.60	2.55
	Nov.	17.80*	21.50	5.60*	16.30	16.30	4.80*	.55	.135*	.155*	.433	.25	.34	23.50	2.60
	Dec.	19.00*	22.60	6.10*	16.00*	16.20	4.95*	.55*	.139*	.155*	.460	.26	.33	22.50	2.50
1961	Jan.	18.90	23.30	7.00	16.00	16.30	5.00	.54	.143	.160	.395	.23	.33	22.50	2.65
	Feb.	19.80	23.50	7.00	16.20	16.80	4.85	.54	.153	.165	.360	.22	.33	23.50	2.80
	Mar.	19.80	23.80	7.00	16.00	16.40	4.50	.54	.146	.160	.308	.22	.35	22.50	2.90
	Apr.	20.00	24.10	6.50	16.70	16.30	4.30	.54	.140	.150	.282	.22	.34	23.10	---
	May	19.10	23.30	5.00	16.10	15.70	4.20**	.54	.136	.145	.284	.22	.36	----	---

SOURCE: *Prices Received by Farmers*, Agricultural Marketing Service, U.S.D.A., Oklahoma City, Oklahoma, Monthly Releases or *Agricultural Prices*, A.M.S., U.S.D.A., Washington, D. C.

[1] Annual prices for crops are season average prices for the crop year weighted by marketings. Annual prices for livestock and products are season average prices for the calendar year weighted by marketings.

* Revised ** Preliminary

Table 2.—Index Numbers of Prices Received by Farmers for Oklahoma Farm Products.[1]
(Percent of 1910-14 Average)

		Wheat	Corn	Oats	Barley	Rye	Grain sorghums	All Hay	Cotton-lint	Cotton-seed	Sweet Potatoes
1959		208	175	143	136	109	142	192	248	207	200***
1960		209	172	150	128	109	125	231	248	199	206
1960	May	210	178	154	130	113	131	218	251	194	---
	June	195	182	139	120	103	130	200	265	194	---
	July	196	182	139	115	101	131	206	265	194	---
	Aug.	200	183	145	120	102	124	211	265	194	223
	Sep.	206	162	145	122	110	116	220	275	204	191
	Oct.	206	158	145	122	110	115	226	261	204	207
	Nov.	208	160	145	124	106	115	234	246	210	211
	Dec.	209	163	148	125	103	116	239	236	215	203
1961	Jan.	212	169	150	129	106	120	245	235	215	215
	Feb.	217	171	148	132	105	126	246	206	220	227
	Mar.	215	172	148	132	99	128	232	230	225	235
	Apr.	204	169	139	124	98	127	227	244	225	---
	May	204	169	136	124	94	131	209	249	225	---

		Cattle	Calves	Sheep	Lambs	Hogs	Wholesale milk	Butterfat	All chickens	Eggs	Wool
1959		460	458	150	322	203	238	226	142	155	189*
1960		394	380	136	307	211	240	228	157	178	207
1960	May	418*	405*	152	344*	207	226*	222*	169*	155	221
	June	400*	394	130*	348*	214*	228*	222*	162*	150	221
	July	385*	377	123*	318	234*	223	222*	166*	144	221
	Aug.	366	350	119*	296*	227*	226	226	160*	158	210
	Sep.	364*	343	119*	286*	219	239*	231	152*	184	210
	Oct.	354*	343	117*	281	233	247	235	152*	221	198
	Nov.	369*	360	121*	281	232	249*	235	144*	243	198
	Dec.	393*	379*	132*	272	227*	257*	231	148*	258	192
1961	Jan.	391	390	152	275	232	260	231	152	222	192
	Feb.	410	394	152	279*	239	252	231	163	202	192
	Mar.	410	399	152	275	233	234	231	155	173	204
	Apr.	414	404	141	287	232	223	231	149	158	198
	May	395	390	108	277	223	218	231	145	160	210

SOURCE: Annual data are averages of months for calendar years and are compiled by Dept. of Ag. Econ., Oklahoma State University, from data supplied by Agricultural Marketing Service, U.S.D.A., Oklahoma City, Oklahoma, and Washington, D. C. For previous years, see Oklahoma Agri. Exp. Sta. Publication P-297, Prices Received by Oklahoma Farmers, 1910-1957.

[1] For the index of purchasing power of a unit of an individual commodity in terms of commodities used in farm production and family living, interest, taxes and wages, divide the index of price received by Oklahoma farmers (in this table) by the index prices paid by United States farmers in Table 4 for the same month and multiply by 100.

* Revised ** Date not available *** 9 months average

Table 3.—Price Indexes of Groups of Oklahoma Farm Products.
(Percent of 1910-14 Average)

		All farm products	All crops	Feed grains	Feed grains and hay	Cotton and cottonseed	Oil bearing crops	All livestock & L.S. Prod.	Meat animals	Dairy products	Poultry and poultry prod.
1959		267	219	158	174	243	262	320	400	254	157
1960		255	220	153	185	243	246	294	349	257	178
1960	May	258*	220*	159	184	238*	238*	300	367*	246*	163*
	June	250*	211*	156	176	248*	247*	292*	355*	249*	157*
	July	247*	213*	156	179	251*	238	285*	345*	244*	153*
	Aug.	246*	216	156	180	256	238	278	330*	247	163*
	Sept.	251*	223	145	175	266	256	281*	326*	258*	181*
	Oct.	252	221	143	176	254	260	286*	322*	264	210*
	Nov.	256*	219	144	179	241	262	295*	334*	265	225*
	Dec.	261*	218	146	183	233	255	309	351*	270	238*
1961	Jan.	261	221	150	188	232	260	305	352	270	210
	Feb.	262	218	150	190	206	259	309*	366	270	197
	Mar.	260	221	154	186	228	268	302	365	253	173
	Apr.	257	217	150	181	241	272	300	368	246	160
	May	252	218	151	175	245	273	290	353	243	160

Purchasing Power Indexes of Groups of Oklahoma Farm Products.[1]
(Percent of 1910-14 Average)

		All farm products	All crops	Food grains	Feed grains	Feed grains and hay	Cotton and cottonseed	Oil bearing crops	All livestock & L.S. prod.	Meat animals	Dairy products	Pltry. and pltry. prod.
1959		90	74	70	53	59	82	88	107	134	86	53
1960		84	73	70	51	62	81	82	98	117	86	60
1960	May	86	73	70	53	61	79*	82	100	122*	82*	54*
	June	84	71	65	52	59	83*	80	98*	119*	83*	53*
	July	83*	71*	66	52	60	84*	80	96*	116*	82*	51
	Aug.	83	72	67	52	60	86	80	93	111	83	55*
	Sept.	84	75	69	49	59	89	86	94*	109*	87*	61*
	Oct.	85	74	69	48	59	86	88	96	108	89	71*
	Nov.	86	74	70	48	60	81	88	99	112*	89*	76*
	Dec.	88*	73	70	49	61	78	86	104*	118*	91	80
1961	Jan.	87	73	70	50	62	77	86	101	117	90	70
	Feb.	87	72	72	50	63	68	86	102	121	88*	65
	Mar.	86	73	71	51	62	75	89	100	121	84	57
	Apr.	85	72	68	50	60	80	90	99	122	81	53
	May	83	72	68	50	58	81	90	96	117	81	53

SOURCE: Compiled by Dept. of Ag. Econ., Oklahoma State University, from data supplied by Agricultural Marketing Service, U.S.D.A., Oklahoma City, Oklahoma, and Washington, D. C. For previous years, see Oklahoma Agri. Exp. Sta. Publication P-297, Prices Received by Oklahoma Farmers, 1910-1957.

[1] The ratio of prices received by farmers to prices paid by farmers for commodities used in farm living and production, interest, taxes and wage rates. For individual commodities, see footnote 1 of Table 2.

* Revised ** Preliminary.

Table 4.—Index Numbers in the United States, Index of Demand Deposits in Oklahoma, and Oklahoma Price Ratios.

		United States index numbers of:					Oklahoma price ratios[4]			
		Prices received by farmers (1910-14=100)	Prices paid by farmers (1910-14=100)	Wholesale prices (1910-14=100)	Industrial manufacturing payrolls[1] (1947-49=100)	Index of demand deposits in Oklahoma[2 3] (1923-25=100)	Hog corn	Egg feed	Turkey feed	Milk feed
1956		230	278	256	161.4	297.4	10.4	9.7	7.2	1.695
1957		235	286	264	162.7	290.9	13.6	9.2	6.7	1.757
1958		250	293	268	148.7	313.0	16.9	10.2	6.9	1.968
1959		240	297*	268	167.2*	334.5	12.6	8.7	6.9	1.877
1960		238	299	269	170.2	326.5	13.3	10.3	7.6	1.902
1960	May	240*	301	270	171.5	293.6	12.6	8.8	7.7	1.763*
	June	235*	299	270	172.5	321.4	12.8*	8.7	7.2	1.827*
	July	236*	298	270	169.0*	334.7	13.4*	8.4	7.2	1.808
	Aug.	234	298	267	169.2	331.5	13.4*	9.2	7.2	1.793*
	Sept.	238*	298	267	172.5	327.1	14.7	10.8	7.6	1.969*
	Oct.	241*	297	270	170.5	328.1	15.9	13.1	8.0	2.047
	Nov.	241	297	270	166.2*	330.9	15.7	14.4	8.3	2.037*
	Dec.	242	298	270	160.6*	354.4	15.3	15.2	8.6	2.074*
1961	Jan.	241	301	270	158.5	354.1	14.8	12.7	7.4	2.024
	Feb.	244	302	270	156.6	341.9	15.1	11.7	7.1	1.997*
	Mar.	243	302	270	157.7**	337.9	14.6	9.9	7.1	1.853
	Apr.	239	302	270	----	339.2	14.8	9.2	7.2	1.814
	May	236	302	267	----	----	14.3	9.1	7.1	**1.753

SOURCE: Indexes of U.S. prices received and prices paid by farmers and indexes of U.S. wholeesale prices, from *Agricultural Prices*, A.M.S., U.S.D.A., Washington, D. C. Indexes of demand deposits in Oklahoma, calculated by Dept. Agri. Econ., Okla. Agri. Exp. Sta. from data furnished by Federal Reserve Board, Washington, D. C. Indexes of industrial manufacturing payrolls, from U. S. Department of Labor, Bureau of Labor Statistics, Washington, D. C.

[1] Unadjusted for seasonal variation.

[2] Demand deposits of Oklahoma members banks of the Federal Reserve System located in places under 15,000 population.

[3] Index numbers based on net demand deposits prior to 1936 and upon gross demand deposits since that date. For a discussion of this index see CURRENT FARM ECONOMICS, Oklahoma Agricultural Experiment Station Series 49, Vol. 13, Nos. 1 and 2. Feb.-Apr., 1940, p. 41.

[4] The number of bushels of corn or pounds of feed which one unit of the commodity (100 pounds of hogs, one dozen eggs, one pound of turkeys or milk) will purchase. Prices used are the official A.M.S. estimates of prices received by Oklahoma farmers except for commercial feeds or ingredients which are official A.M.S. estimates of prices paid by Oklahoma farmers. These ratios are computed on the basis of fixed rations and are not directly comparable with ratios computed from other rations. The composition of each ration used is available upon request.

* Revised. ** Preliminary.

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